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Remarks/Arguments

Applicant has amended Claim 1 to incorporate the limitations of dependent Claims 2 and 3 and also to call for "an apparatus for transporting a semiconductor wafer." Independent Claim 1 now calls for "the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion; and wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm. " Independent claim 14 calls for "an end effector having at least one extension wherein each extension includes a top surface and a bottom surface and the extension having a free end, and the top surface having a substantially flat portion, and a tapered portion extending from the substantially flat portion towards the free end, and wherein the thickness of the extension between the substantially flat portion and the bottom surface is about 0.05-0.2 mm less than the opening between the adjacently positioned semiconductor wafers in the cassette housing." As such, Applicant's claims an end effector extension (finger or blade) with an increased thickness over prior art end effectors. The increase in thickness of the finger portion of the end effector decreases the likelihood of the finger being broken off if the finger accidentally strikes wafer processing equipment or a wafer. See the instant application in the last two sentences of paragraph 33. The prior art relied on by the Examiner fails to establish a relationship between the thickness of the end effector finger, and a tapered free end to solve the problem of breaking of end effector fingers during wafer processing.

Claims 1 and 4 had been rejected under 35 USC §102 as being anticipated by Choi et al. (with particular emphasis on Figures 4 and 8) and anticipated by Dimock et al. (with particular emphasis on Figure 9). Again neither reference teaches that a tapered free end of an end effector can be utilized in combination with increasing the thickness of the finger to decrease the likelihood that the finger will be broken during wafer processing activities. In fact Choi et al. in Figure 8 identifies the thickness of the end effector finger by the arrow labeled "T" but nowhere in the reference does Choi et al. describe anything whatsoever regarding the thickness of the finger. Dimock et al. fails to disclose anything regarding the thickness of the wafer blade shown in Figure 9. Applicants' invention is now claimed an independent Claim 1 and Dependent Claim 4 is not anticipated by Choi et al. nor Dimock et al.

Claims 1, 4 and 11 have been rejected under 35 USC §102 as being anticipated by De et al. De et al. simply discloses a wafer handling blade having a tapered free end. De discloses a variety of thicknesses of various components in the apparatus, including thicknesses h1-h4 but fails to disclose anything whatsoever regarding the thickness of the flat portion of the wafer blade adjacent the tapered free end. De et al. failed to suggest that a combination of a tapered free end and an increased thickness in the indefector finger can be utilized to decrease the likelihood that the indefector finger will be damaged or broken during wafer handling activities. As such, Applicants' now claimed invention, as set forth in independent Claim 1, 4 and 11 calling for "the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion;

and wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm" in not anticipated by De et al.

Claims 1, 4 and 10-11 had been rejected under 35 USC §102 as being anticipated by Van Rooy. Like the other references of record, Van Rooy simply discloses a wafer handling blade with a tapered end and a vacuum port on the tapered surface. Van Rooy fails to disclose any relationship between the thickness of the blade or finger and the use of a tapered free end for the purpose of solving a problem of damaged wafer end effectors during wafer handling. Applicants' now claimed invention as set forth in claim 1 calling for "the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion; and wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm is not anticipated by Van Rooy.

Claims 1, 5, 8, 13 and 19 have been rejected under 35 USC §102 as being anticipated by Kim et al. Kim Et al. disclosed a wafer handling device having a tapered free end for the purpose of preventing damage to the wafer by scratching or generating contaminating particles, or breaking the wafer on contact with a wafer handling blade or finger. See Column 4 Line 29-34. Kim et al. failed to recognize the ability to increase the thickness of the end effector blade or fingers to prevent damage to the fingers or blade during wafer handling. Applicants' now claimed invention as set forth in claim 1 calling for "the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion; and wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm is not anticipated Kim et al. Claim 19 is now canceled.

Claims 1, 5, 8, 13 and 19 have been rejected under 35 USC §102 as being anticipated by Nam et al. Nam et al. discloses an end effector with fingers having tapered free ends and vacuum ports having protrusions extending outwardly from the end effector. Again, Nam et al. fails to suggest that an end effector finger can be increased in thickness in combination with a tapered free end to avoid damage to the finger during wafer handling. Applicants' now claimed invention as set forth in claim 1 calling for "the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion; and wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm" ais not anticipated by Nam et al. Claim 19 has been canceled

Claims 1, 5, 8 and 19 have been rejected under 35 USC §102 as being anticipated by Li et al. Applicants maintain that now that Independent Claim 1 calls for an apparatus for transporting a semiconductor wafer, Li et al. is now not analogous part. In any event, like the other references of record, Li et al. failed to recognize that an end effector blade or finger can be increased in thickness when used in combination with a tapered free end to avoid damage to the end effector during wafer handling activities. Applicants' now claimed invention in including dimensions and angles is not anticipated by Li et al. Claim 19 has been canceled.

Claims 1, 4, 8, 11 and 12 have been rejected under 35 USC §102 as being anticipated by Duis et al. Applicants maintain that now that Independent Claim 1 calls for an apparatus for transporting a semiconductor wafer, Duis et al. is now not analogous part. In any event, Duis et al. simply fails, like the other references of record, to disclose any relationship between an end effector having a blade or finger with a tapered end and the ability to increase the thickness of

the blade or finger to avoid damage to the blade or finger during wafer handling. Applicants' now claimed invention including the claimed dimension and angle is not anticipated by Duis et al.

Claims 1, 4, 8, and 11-13 have been rejected under 35 USC §102 as being anticipated by Shamlou et al. Shamlou et al. has disclosed a wafer handling device having a rear shoe 20 that is formed so as to have a leading edge 122 that is tapered at an angle that permits the wafer to slide into a holding pocket between the front shoe 116 and the rear shoe 120 even when expansion differences between the handling blade and the semi conductor substrate would otherwise cause a misfit. See the paragraph bridging Columns 8 and 9. Again like the other references of record, Shamlou et al. failed to disclose or suggest any relationship between the ability to have an end efector blade or finger with a tapered free end and an increase in the thickness of the blade or finger to prevent damage to the blade or finger during wafer handling. Applicants' now claimed as set forth in claim 1 calling for "the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion;
and wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm" is not anticipated by Shamlou et al.

Claims 2, 3, 6, 7 and 14-20 have been rejected under 35 USC §103 as being unpatentable over Kim et al. The examiner has taken the position that dimensions set forth in Claim 2 (the limitations of which are now incorporated in Independent Claim 1) are considered design expedients, however, the references of record fail to suggest any relationship between the thickness of an end effector blade or finger and the use of a tapered free end to prevent damage

to the blade or finger and at the same time prevent damage to the wafer. In fact, Schwartz et al. U.S. Patent Number 4,620,738, which has been made of record but not relied on by the examiner, shows in Figure 4b a wafer handling blade or finger which has a thickness substantially less than the thickness between adjacent semiconductor wafers. As such, Schwartz et al. actually teaches a way from Applicant's now claimed invention as set forth by the dimensions of claims 1 and 14. Applicants' now claimed invention would not have been obvious in view of Kim et al. either individually or in combination with any of the other reference of record, particularly in light of the teaching away effect of Schwartz et al.

Claims 2, 3, 6, 7, 14-16 and 18 have been rejected under 35 USC §103 as being unpatentable over Dimock et al. The examiner has taken the position that the dimensions of the blade and the cassette arrangement and the angle of the tapered portion appear to be approximate to that of the claims are considered to be design expedients which would have been within the level of "routine skill in the art at the time the invention was made. Again Dimock et al. simply discloses a wafer handling device adding a blade and tapered free end. No discussion whatsoever is provided in Dimock et al. regarding the thickness of the wafer handling blade and any relationship between the positioning of wafers in a cassette has called for in applicants' Independent Claim 14. Likewise, Dimock et al. fails to disclose any relationship between the thickness of the flat portion of the wafer handling blade and a tapered end that is now set forth in independent Claim 1. Applicants' now claimed invention would not have been obvious in view of Dimock et al. either individually or in combination with any of the other references of record, particularly in light of the teaching way effect of Schwartz et al.

Various other claims have been rejected under 35 USC §103 in view of Duis et al., Shamlou et al., and Li et al. wherein the Examiner has taken the position that the differences between the claims and the disclosure of these references are considered as design expedients which would have been within the level of routine skill in the art at the time the invention was made. For the reasons stated above with respect to the rejection of claims under 35 USC §102 for each of these references, Applicant maintains again that none of these references disclose any connection or relationship between the thickness of an end effector blade or finger in the use of a tapered free end for the purpose of preventing damage to the end effector blade or finger during wafer handling activities. Applicants' now claimed invention would not have been obvious in view of any of those references either individually or in combination with other references of record, particularly in view of the teaching way effect of Schwartz et al.

In view of the above amendments and remarks, Applicant respectfully requests reconsideration and allowance of the claims now in the case.

Respectfully submitted

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